Remarks

Claims 1-23 stand rejected under 35 U.S.C. §102(e) as being anticipated by Brobst *et al.* (U.S. Pat. No. 6,053,409).

Please note that a Correct Version of the Claims is provided herein as an Appendix which properly reflects the file history amendments to claims 21 and 22, wherein the phrase " whereby said light beam is expanded" was removed from claim 22 to claim 21. The Examiner indicates attention to this in the Examiner's Answer, page 5.

For at least the following reasons, the claims currently under consideration are believed to be patentable over the cited reference. Accordingly, it is respectfully requested that the rejections of claims 1-23 be reversed.

A. Brobst *et al. does not disclose each and every limitation as set forth in the claims of the present invention.*

In the Examiner's Answer mailed June 12, 2003, the Examiner contended:

> The instant specification clearly discloses a mirror (300 in Fig. 7b) which reflects the light beam from a surface of the piezoelectric material onto the target (60) (see line 25+ in page 13 of the specification). Similarly, Brobst *et al.* discloses an oscillating mirror (129) for generating the scanning beam (138) by reflecting the laser beam (134) onto the barcode labels (144 and 148) (see Fig. 5A; column 4, line 60 – column 5, line 24).

The Examiner goes on to state that,

> In any event, Brobst et al. also discloses a polygonal mirror (16) having a concave facet (44) and a flat facet (46) which expands/reflects the light beam, and the polygonal mirror can be substituted for the oscillating mirror in the scanning apparatus (see Figs. 1-5A; column 3, line 52-column 4, line 28).

However, contrary to the Examiner's assertions, Brobst *et al.* does not disclose ***a beam expander***, as recited in independent claims 1, 15, and 23. The Examiner relies on an oscillating mirror 129 of Brobst *et al.* as being equivalent to the beam expander of the subject claims. However, the oscillating mirror 129 of Brobst *et al.* is actuated by a motor for producing a

scanning beam (col. 5, lines 1-4). The oscillating mirror 129 does not provide for an expansion of a light ray, in contrast to the beam expander of claims 1, 15, and 23.

The invention of Brobst* et al. *operates to focus the light beam at varying depths. The mirrors (16, 60, 80, 100, 128, 129) of Brobst *et al.* rotate or oscillate to direct the light beam toward the target, providing a plurality of differing focal lengths, the focus of which is corrected either through the use of a rotating multi-faceted mirror and/or by controlling deformation of the deformable mirror assembly 124. In contrast, ***the present invention uses the technique of beam expansion (via a beam expander) to expand the light beam to cover more of the target*** by changing the angle of reflection of the light beam.

The focusing aspect of Brobst *et al.* is addressed repeatedly. To wit, "The present invention provides a dynamic focusing apparatus...", and "[T]he scanning beam is focused at a plurality of depths within the region of interest..." and still, "...a dynamic focusing apparatus...which employs...deformable mirror to increase the depth of filed..." (Summary of the Invention - col. 2, ll. 5-23).

Still further, with respect to the preferred embodiment of FIG. 1 – "...scanning beam 32 is then projected at a fixed focal point...", and "[S]ince...facet 44 has a different curvature...scanning beam 32 is focused at a different focal point..." (col. 4, ll. 3-9). Figures 2,3, and 4 follow with similar embodiments using rotating mirrors having facets that facilitate varying focal points.

FIG. 5 of Brobst *et al.* introduces a deformable piezoelectric scan mirror assembly 124 for use with the rotatable polygonal scan mirror 128 to again, focus on targets 144 and 148 (as illustrated in the drawing). FIG. 5A introduces the oscillating mirror 129 instead of the scanning mirror 128 to produce a similar result of FIG. 5 (*i.e.*, "...the laser beam 134 is reflected off the deformable mirror assembly 124...to focus the scanning beam 138..." (col. 5, ll. 1-4).

FIG. 6 and FIG. 7 illustrate two types of deformable mirror assemblies 124. The assembly 124 of FIG. 6 "...varies the optical power of the mirror 160" (col. 5, ll. 23-34). The assembly 124 of FIG. 7 uses a deformable mirror 162 that is varied to focus the scanning beam 163 (col. 5, ll. 35-36). Numerous other references are made by Brobst *et al.* to apparatus that are used to focus the light beam, the content of which will not be covered herein for sake of brevity.

Brobst *et al.* does disclose an "expansive" light beam 220, however, the beam 220 is provided directly from a light source 202 (col. 6, ll. 21-22).

In contrast, as indicated hereinabove, the purpose of the beam expander 400 of the present invention is not related to focusing of the light beam, but directed more to the opposite effect of expanding the light ray to cover more of the target by changing the angle of reflection of the light beam, to wit, "The arcuate reflective outer surface 410 provides for an expansion of the light ray 100a from source 100 thereby amplifying the scanning field size achievable..." (p.14, ll. 9-12).

In the Final Office Action dated August 21, 2002, it is stated that the beam expander reflects a light beam onto a target rather than expanding the light ray. The Examiner is relying on a portion of the claim which recites an additional function for the beam expander. In particular the Examiner is relying on the limitation, "said reflector reflecting a first portion of said light beam from said light source onto said beam expander, said beam expander reflecting at least a second portion of said first portion of said light beam onto said target..." as defining the function of the beam expander. However, the Federal Circuit has consistently held that "terms in a patent claim receive their plain, ordinary, and accepted meaning within the community of those of ordinary skill in the relevant art...[t]o discern accepted meaning, however, the construing court consults the specification and relevant prosecution history to provide context for understanding the meaning of the terms..." *Leggett & Platt, Inc. v. Hickory Springs Mfg. Co.*, 285 F.3d 1353, 62 USPQ2d 1266 (Fed. Cir. 2002). It is submitted that both the plain, ordinary, and accepted meaning of beam expander and the specification of the subject application supports the construction of a beam expander as providing an expansion of a beam, or light ray. For example, see U.S. Patents 6,494,766 ("...beam expander (not illustrated) may be positioned in the path of the light beam to expand the light beam..."); 6,488,414 ("...a beam expander 34, which allows the light beam of photons guided by the core 36 of optical fiber 22, to expand and spread outward..."); 6,473,208 ("The beam expander 14 expands the beam diameters of the signal light..."); 6,470,752 ("The beam expander 7 expands a laser light beam..."); 6,404,957 ("...the beam expanders 210 expand the separated input lights..."). Accordingly, it is clear that one skilled in the art would have recognized that a beam expander is a device which is employed to

expand a light ray. Moreover, the specification of the subject application supports this meaning on page 14:

> The arcuate reflective outer surface 410 provides for an ***expansion of the light ray*** 100a from [light] source 100 thereby further amplifying the scanning field size achievable with a piezoelectric material 110 which itself may have a fixed maximum displacement...the beam expander 400 may alternatively have a spherical reflective outer surface in order to achieve two-dimensional expansion of the light ray. (emphasis added).

Thus, although the beam expander may provide the additional function of reflecting a light beam onto a target, as recited in the claims, the beam expander also provides for an expansion of the light beam, as would have been recognized by one of ordinary skill in the art and as further supported by the specification. The oscillating mirror of Brobst *et al.* does not provide for an expansion of a light beam. Accordingly, Brobst *et al.* does not disclose a beam expander (*e.g.*, each and every element) as set forth in independent claims 1, 15, and 23.

Regarding claim 21, the Examiner contends that Brobst *et al.* clearly teaches the polygonal scan mirror and the oscillating mirror reflect the light beam from the light source onto the target. However, it is submitted that Brobst *et al.* does not disclose ***whereby said light beam is expanded by the mirror*** as recited in the subject claim. Expanding a light beam is absent from Brobst *et al.* Thus, Brobst *et al.* does not describe each and every element as set forth in claim 21.

CONCLUSION

For at least the aforementioned reasons, Brobst *et al.* neither anticipates nor makes obvious the subject invention as recited in claims 1, 15, 21, and 23. Claims 2-14, 16-20, and 22 respectively depend from claims 1, 15, and 21. Thus, the claims currently under consideration are believed to be patentable over the cited reference, and it is respectfully requested that the rejections of claims 1-23 be reversed.

In the event any additional fees are due in connection with this paper, authorization to charge Deposit Account No. 50-1063 is hereby granted.

Respectfully submitted,
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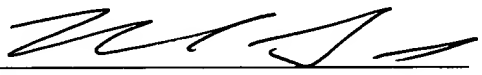

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Appendix of a Correct Version of the Claims

1. A system for scanning a target, comprising:

a light source providing a light beam;

a reflector having an arcuate reflective surface with a variable shape;

a shape controlling system for controlling said shape of said reflector; and

a beam expander;

said reflector reflecting a first portion of said light beam from said light source onto said beam expander, said beam expander reflecting at least a second portion of said first portion of said light beam onto said target, and said shape controlling system selectively varying said shape of said reflector, whereby said second portion scans across at least a portion of said target.

2. The system of claim 1, further including a photo sensor, wherein said target reflects at least a portion of said second portion of light onto said photo sensor and said photo sensor generates an electrical signal representative of said at least a portion of said second portion of light.

3. The system of claim 1, wherein said reflector includes a piezoelectric material with an arcuate reflective surface.

4. The system of claim 1, wherein said shape of said reflector is generally radial.

5. The system of claim 1, wherein said shape controlling system provides a voltage signal to said piezoelectric material, and said shape of said reflector is varied according to said voltage signal.

6. The system of claim 5, wherein said shape of said reflector is generally radial.

7. The system of claim 6, wherein said beam expander has a generally cylindrical reflective outer surface.

8. The system of claim 6, wherein said beam expander has a generally spherical reflective outer surface.

9. The system of claim 6, wherein said beam expander includes a convex arcuate reflective surface.

10. The system of claim 1, wherein said beam expander includes a convex arcuate reflective surface.

11. The system of claim 1, wherein said beam expander has a generally cylindrical reflective outer surface.

12. The system of claim 6, further including a photo sensor, wherein said target reflects at least a portion of said second portion of light onto said photo sensor and said photo sensor generates an electrical signal representative of said at least a portion of said second portion of light.

13. The system of claim 12, further including a conversion and interface system receiving said electrical signal from said photo sensor and converting said electrical signal to a digital code.

14. The system of claim 2, further including a conversion and interface system receiving said electrical signal from said photo sensor and converting said electrical signal to a digital code.

15. A method of scanning a target, comprising the steps of:

providing a reflector having an arcuate reflective surface with a variable shape;

providing a beam expander;

providing a light beam from a light source to said reflector;

reflecting a first portion of said light beam off of said reflector and onto said beam expander;

reflecting a second portion of said light beam off of said beam expander and onto said target; and

varying said shape of said reflector , thereby scanning at least a portion of said target with said second portion of said light beam.

16. The method of claim 15, further including providing a control system with a control signal, wherein said shape of said reflector varies according to said control signal.

17. The method of claim 16, wherein said reflector includes a piezoelectric material having at least two electrodes, and said shape varies according to the voltage across said electrodes.

18. The method of claim 16, wherein said beam expander includes a convex arcuate reflective surface.

19. The method of claim 16, wherein said beam expander has a generally cylindrical reflective outer surface.

20. The method of claim 15, wherein said beam expander has a generally cylindrical reflective outer surface.

21. A target scanning apparatus, comprising:

a housing having generally horizontal top and bottom sides, generally vertical left and right sides, said sides extending longitudinally between generally vertical front and rear ends;

a scanning system mounted in said housing and having a reflector with a variable shape arcuate convex reflective surface, a light source providing a light beam to said reflector, and a control system adapted to control said shape of said reflector;

a mirror displaced from said reflector in said housing near one of said front and rear ends; and

an aperture in one of said sides near said one of said front and rear ends;

said reflector reflecting a first portion of said light beam onto said mirror, and said mirror being oriented so as to reflect a second portion of said light beam from said reflector through said aperture and onto said target, and said control system varying the shape of said reflector whereby said second portion of said light beam scans at least a portion of said target, whereby said light beam is expanded.

22. The apparatus of claim 21, wherein said mirror has a convex arcuate reflective surface.

23. A system for scanning a target, comprising:

means for providing a light beam;

reflector means for reflecting a first portion of said light beam;

expander means for reflecting a second portion of said light beam from said reflector means onto said target; and

means for varying said shape of said reflector means, by which at least a portion of said target is scanned with said second portion of said light beam.